FRIDAY, FEBRUARY 21, 2014, 2:55PM–4:55PM PARALLEL LONG ORAL ABSTRACT C TRANSPLANT BILIARY

LO-C.01 ABSORBABLE BIOPROSTHESIS FOR THE TREATMENT OF BILE DUCT INJURY IN AN EXPERIMENTAL MODEL

E. E. Montalvo Javé[1,5], A. R. Jaime Limon[1], M. J. Kim Koh[1], M. A. García Pineda[1,5], B. León Mancilla[1], F. Rojas Mendoza [2], J. Tapia Jurado[1], C. Montalvo Arenas[3] and J. A. Saavedra [4]

[1]Department of Surgery, School of Medicine, Universidad Nacional Autónoma de México (UNAM), MEXICO CITY, MEXICO; [2]Department Of Gastroenterology, Medica Sur Clinic Foundation, MEXICO CITY, MEXICO; [3]Department Of Cellular And Molecular Biology, School Of Medicine, UNAM, MEXICO CITY, MEXICO; [4]Department Of Pathology, Medica Sur Clinic Foundation, MEXICO CITY, MEXICO; [5]Department Of Surgery, Hospital General De México, MEXICO CITY, MEXICO

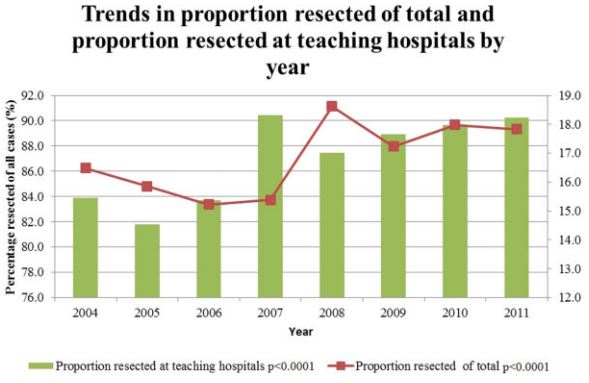
Biodegradable stent implants are an alternative replacement of the bile duct due to benign stenosis, bile duct injury or cancer. We employed an acellular bone based bioprosthesis (10% water, 65% collagen, 25% hydroxyapatite) as an alternate treatment for biliary injury. Eight Landrace pigs underwent an initial laparotomy in which 3 cm of the common bile duct was excised. An end to end anastomosis (bile duct-prosthesis-bile duct) with the liquid collagen coated and hydrogen peroxide gas plasma sterilized bioprosthesis was performed. Every pair of pigs underwent a 1, 6, 12, 18-month follow-up, with liver function test, cholangiography, cholangioresonance, cholangioscopic procedure with Spyglass, Cytokeratin (CK-7, CK-19) immunohistochemistry, and H-E staining for microscopic evaluation. No mortality or infectious complications were observed. All gained weight. None showed acolia or jaundice, nor increased hepatobiliary enzymes preoperatively or at 7, 30, 60, 90 or 180 days. Cholangioresonance showed adequate permeability and no stenosis, moderate dilatation of extra-intrahepatic ducts were found in an 18-month follow-up model. Cholangioscopy with Spyglass showed the bioprosthesis insertion in place, without stenosis. No necrosis, stricture or bile leakage was found on the exploratory laparotomy. Biopsies were obtained from the bifurcation of the bile duct to the descending duodenum, including the graft site. Microscopy at 1-month post-implantation showed a rich deposit of collagen fibers with inflammatory cellular infiltrate. At the 3-month the graft site developed a columnar epithelium similar to the original, CK-7 and CK-19 positive. This collagen based bioprosthesis has potential for its application as a novel treatment for biliary injury and stenosis.

LO-C.02 NATIONAL VIEW ON BILIARY CANCER: RISING RESECTIONS AND CONSIDERABLE COMPLICATIONS

C. J. Yang[1], L. A. Bliss[1], W. B. Al-Refaie[2], A. R. Evenson[1], K. Khwaja[1], S. C. Ng[1] and J. F. Tseng[1]

[1]Beth Israel Deaconess Medical Center, Boston, MA; [2]MedStar Georgetown University Hospital, Washington, DC

Background: Resection remains the mainstay of curative treatment for biliary tract neoplasms. Literature suggests a minority of eligible patients undergo resection. Aim of this study was to describe current trends in hepatopancreaticobiliary resections and to delineate complication rates.
Methods: Retrospective review of U.S. Nationwide Inpatient Sample 2004–2011 for biliary tract cancer. Procedures: Hepatectomy, lobectomy, cholecystectomy, ablation of liver lesion, bile duct resection, biliary-enteric anastomosis, pancreaticoduodenectomy. Categorical variables analyzed by $\chi 2$, trend analyses by Cochran-Armitage, adjusted predictors of outcomes by multivariable logistic regression.
Results: 238,968 patient-discharges occurred. 40,414 (16.9%) underwent resection. Majority of resections were performed at teaching hospitals (87.3%) and on elective admissions (82.8%). Proportion of patients resected and proportion at teaching hospitals increased over time ($p < 0.0001$). Mortality remained stable over time 4.2% (2.9–4.9%). There was a statistically significant increase in complications over time ($p < 0.0001$). Complication rates were not affected by teaching status or by annual HPB case-volume of hospital after adjusting for confounding. Risk factors for complication: emergency admission (OR 1.75, 95% CI 1.49–2.05), Medicare (vs private insurance; OR 1.18, 95% CI 1.02–1.38), male (OR 1.42, 95% CI 1.25–1.61), increasing comorbidities, and age ≥50 (OR 1.54, 95% CI 1.28–1.85).
Conclusion: An increasing proportion, yet still a minority, of biliary tract cancers are being resected in the US. There has been a shift towards teaching hospitals, high volume centers, and elective admissions. Despite this favorable trend, complication rates are substantial. To maximize the benefit of hepatopancreaticobiliary resections to this small cohort of patients, future investigations should target complication reduction interventions.



LO-C.03 IS LOCAL RESECTION ADEQUATE FOR T1 STAGE AMPULLARY CANCER?

A. Amini, J. Miura, T. Jayakrishnan, F. Johnston, S. Tsai, K. Christians, C. Gamblin and K. Turaga
Medical College Of Wisconsin, Milwaukee, WISCONSIN

Introduction: Concerns for morbidity of pancreaticoduodenectomy (PD) has led to practitioners adopting endoscopic resection or ampullectomy without lymphadenectomy in the treatment of T1 ampullary cancer. We hypothesized that survival for patients undergoing local resection of ampullary cancer was inferior to those undergoing PD.
Methods: All patients with ampullary cancer reported in the Surveillance, Epidemiology, and End Results database between 2004 and 2010 were collected. Demographic features, adjuvant radiation and 5-year survival rates according to nodal disease and histologic type were compared.
Results: There were 1,916 cases of ampullary cancer and 421 (22%) had T1 disease. Among those with T1 disease, 217 (51%) received endoscopic treatment only, 21 (5%) underwent ampullectomy alone, 20 (5%) underwent ampullectomy with regional lymphadenectomy, and 163 (39%) underwent PD. For patients with complete nodal staging (PD), 23% had metastatic disease in the nodes. Grade was significantly associated with node positivity with 10% positivity in well-differentiated ($n = 61$), 12% in moderately-differentiated ($n = 163$), and 27% in poorly-differentiated tumors ($n = 85$, $P = 0.007$). After adjusting for demographic characteristics, node positivity was significantly associated with a worse survival (HR 2.2 (95% CI 1.3–3.8, $p = 0.003$)) in multivariate models. Survival was improved with either an ampullectomy with regional lymphadenectomy (HR 0.16 (95% CI 0.08-0.03, $p < 0.001$)) or a PD (HR 0.26 (95% CI 0.15–0.44, $p < 0.001$)).
Conclusion: Patients with early stage ampullary cancer have a high risk for nodal metastases especially if they are higher grade lesions. Nodal clearance with a regional lymphadenectomy or a PD is essential to ensure long term survival for these patients.

LO-C.04 MODEL TO PREDICT SURVIVAL AFTER SURGICAL RESECTION OF INTRAHEPATIC CHOLANGIOCARCINOMA: THE MAYO EXPERIENCE

S. M. Ali[1], C. J. Clark[1], T. Mounajjed[3], T. Wu[3], W. Harmsen[2], K. M. Reid-Lombardo[1], M. L. Kendrick[1], M. B. Farnell[1], D. M. Nagorney[1] and F. Que[1]
[1]Division Of Gastroenterologic And General Surgery, Rochester, MN; [2]Division Of Biostatistics, Rochester, MN; [3]Division Of Anatomic Pathology, Rochester, MN

Background: The AJCC 7th edition has recently been validated and shown to accurately predict survival of patients with intrahepatic cholangiocarcinoma (ICC). We attempted to investigate the validity of recent findings.
Methods: A single center retrospective cohort study; with histo-pathological restaging of all consecutive ICC patients who underwent primary surgical resection between 1997 and 2011. Patients with metastatic disease, palliative operations or evidence of hepatocellular/cholangiocarcinoma variant on microscopic examination were excluded. Overall survival was compared using Kaplan-Meier estimates and log-rank tests.
Results: A total of 151 patients (54% females) with median follow up of 4.5 years met our inclusion criteria. The mean age and mean BMI of the cohort was 58.7 ± 12.1 years and 28.3 ± 5.6 kg/cm2 respectively. AJCC was [stage I, 44(29%), Stage II, 44(29%), Stage III, and Stage III/IVa 63(42%)]. Type of tumor growth was periductal in 36 (25%) patients and mass forming in 105 (75%) patients. Nine(6%) patients had cirrhosis, 19(12%) had steatohepatitis and 68 (45%) had necrosis. Tumor grade was low in 75 (49%) and high in 76(51%) patients. Resection margin was <1 mm in 35 (25%), 2–9 mm in 63(45%) and >10 mm in 41(30%) patients. Major liver resection (>3 segments) was performed in 64 (42%) patients. Survival analysis showed statistically significant results for cirrhosis ($p < 0.01$), resection margin ($p < 0.01$), grade ($p < 0.01$) and AJCC staging ($p = 0.04$).
Conclusions: Our analysis shows that in addition to AJCC criteria; inclusion of grade, tumor growth type, extent of resection margin and cirrhosis offers a more accurate model for survival in our cohort.

LO-C.05 ECONOMIC ANALYSIS OF NEAR INFRARED NAVIGATING SURGERY IN CHOLECYSTECTOMIES IN CLEVELAND CLINIC FLORIDA

F. Dip, M. Roy, A. Rosales-Velderrain, C. Simpfendorfer, E. Lo-Menzo, R. Rosenthal and S. Szomstein
Cleveland Clinic Florida, Weston, FLORIDA

Introduction: Fluorescent cholangiography (FC) is a novel intraoperative procedure involving infrared visualization of the biliary structures. We evaluated the costs and effectiveness of routinely implemented FC and intraoperative cholangiogram (IOC) during laparoscopic cholecystectomy (LC).
Material and Methods: All patients enrolled in an IRB approved prospective study comparing LC with FC and IOC between February and June 2013 were reviewed. The procedure time, procedure cost and effectiveness of the two methods were analyzed and compared.
Results: A total of 43 patients (21 males and 22 females) were analyzed. The mean age was 49.53 ± 14.35 years and mean body mass index (BMI) was 28.35 ± 8 kg/m^2. The overall mean operative time was 64.95 ± 17.43 minutes. FC was faster than IOC (0.71 ± 0.26 mins vs. 7.15 ± 3.76 mins; $p < 0.0001$). FC was successfully performed in 43 out of 43 cases (100%) and IOC in 40 out of 43 cases (93.02%). FC was less expensive than IOC (14.10 ± 4.31 vs. 778.43 ± 0.40 dollars; $p < 0.0001$). All surgeons found the routine use of FC useful.
Conclusion: In our study FC was effective in delineating important anatomic structures during LC. It was cheaper than IOC.

LO-C.06 COMPARISON OF LONG TERM SURVIVAL BETWEEN LIVER TRANSPLANTATION AND RESECTION IN PATIENTS WITH STAGE I AND II CHOLANGIOCARCINOMA – A NATIONAL RETROSPECTIVE ANALYSIS

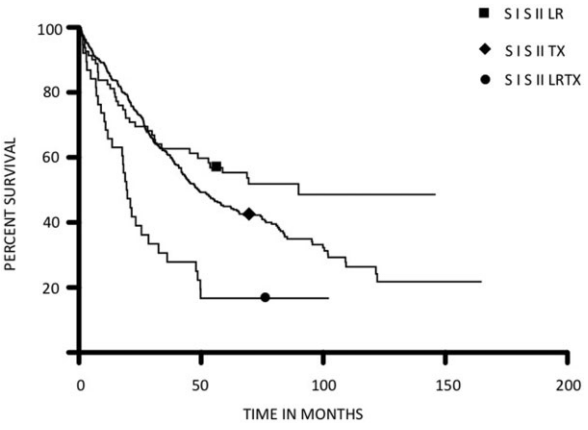
R. M. Seshadri, D. J. Niemeyer, R. Z. Swan, D. Sindram, J. B. Martinie, M. Russo and D. A. Iannitti
Carolinas Medical Center, Charlotte, NC

Introduction: Optimal surgical and oncologic treatment for patients with early stage hepatocellular carcinoma is considered to be liver transplantation. It is unknown if a similar survival benefit exists for cholangiocarcinoma (CCA). We aimed to investigate the comparative survival of early stage cholangiocarcinoma treated with resection, locoregional therapy or transplantation.

Methods: Stage I and II CCA patients (from 1998–2006) were identified from the National Cancer Database (a joint venture of the Commission on Cancer and the American Cancer Society) and survival analysis was calculated using Kaplan Meier Curves and Log Rank tests.

Results: 837(452 M /385 F) patients with stage I or II CCA (out of 7581 CCA pts) met criteria for the study. 81 patients (66 M, 15 F) had LT, 376 patients (164 M, 212 F) had LR and 38 had LRTX (22 M, 17 F). The mean age of LR, LT, LRTX groups was 54, 64 and 65 respectively. Median survival for patients who underwent LT was 89.9 months, LR was 49 months and LRTX was 19.6 months.

Conclusion: There was no statistical difference between patients undergoing a liver transplant or a resection ($p = 0.07$). The survival curves suggest that liver resection offers a survival benefit after 3 years compared to transplant. The locoregional therapy group had the lowest survival but this may be due to patient or tumor characteristics which could not be validated from the database.



LO-C.07 HEPATIC ARTERIAL FLOW PREDICTS BILIARY COMPLICATIONS AND SURVIVAL IN LIVER TRANSPLANT RECIPIENTS

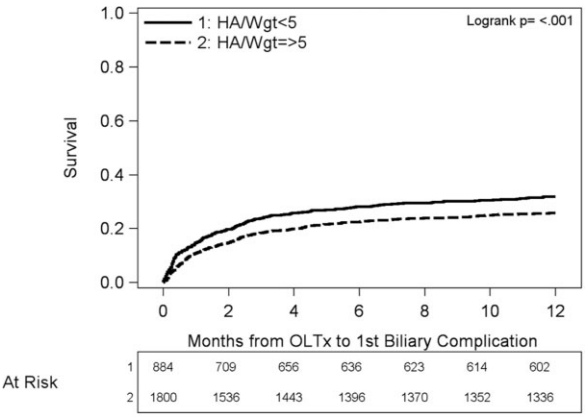
P. T. Kim, G. Saracino, L. Jennings, M. Ramsay, G. J. McKenna, G. Testa, N. Onaca, T. L. Anthony, R. Ruiz, M. Levy, R. Goldstein and G. Klintmalm
Baylor University Medical Center, Dallas, TX

Introduction: Adequate hepatic arterial (HA) flow to the bile duct is essential for its viability in liver transplantation. This study was conducted to determine the relationship between directly measured hepatic arterial (HA) flow and biliary complications and survival after deceased donor liver transplantation.

Methods: A retrospective review of HA and portal vein flows from 2684 liver transplant recipients over a 25-year period was performed from a prospectively maintained database. Rates of biliary complications (biliary leaks, anastomotic and non anastomotic strictures) and survival were compared between two groups: patients with HA flow per body weight ratio of <5 ml/min/kg (N = 884), (Group 1) and >5 ml/min/kg (N = 1800), (Group 2).

Results: Patients in Group 1 had higher body weight (93 vs. 77 kg, $P < 0.0001$), higher MELD scores (17 vs. 16, $P = 0.0002$), lower HA flow (352 vs. 617 ml/min, $P < 0.0001$), and higher portal venous (PV) flow 2206 vs. 2143 ml/min, $P = 0.0452$). There was no difference in cumulative hepatic arterial complications between the groups (13.9 vs. 12.2%, $P = 0.2191$). Pattients in Group 1 had higher rates of biliary complications at 2 months, 6 months and 12 months (19.8%, 28.2% and 31.9% vs. 14.8%, 22.4% and 25.8%, respectively, $P < 0.001$) and lower graft and overall survival at 1 year, 2 years and 5 years (graft: 79.4%, 73.4%, and 63.5% vs. 85.8%, 81.1% and 71.5%, $P = 0.001$; overall 84.3%, 79%, 68.7% vs. 89%, 84.3%, and 75.2%, $P < 0.001$).

Conclusion: Hepatic arterial flows per weight ratio of <5 ml/min/kg predicts biliary complications and is associated with lower graft and patient survival.



LO-C.08 LIVER TRANSPLANTATION IS A HIGHLY EFFECTIVE TREATMENT FOR MANAGEMENT OF HEPATOCELLULAR CARCINOMA, EVEN FOR HIGHLY SELECTED ADVANCED STAGE PATIENTS

M. Doyle, N. Vachharajani, K. Fowler, K. Korenblat, J. Lowell, S. Shenoy, J. Crippin, Y. Lin, J. Wellen, N. Saad and W. Chapman
Washington University School Of Medicine, St. Louis, MO

Introduction: Optimal management of HCC remains controversial, with a high recurrence rate in patients undergoing hepatic resection. While results for orthotopic liver transplantation (OLT) have been favorable within Milan, concerns about recurrence have limited this therapy in patients beyond Milan. Since 2000, we have used a strategy of downstaging with a 4–6 month period of observation prior to OLT.

Method: We reviewed our experience from 1/1/2000–12/31/2012 using prospective database, during which time 937 cadaveric adult OLT were performed. Patient demographics, recurrence, and survival were reviewed and Kaplan-Meier plots generated with statistical comparison made using Log-Rank test.

Results: 32% (300/937) patients had HCC. 243 (81%) of HCC cases were diagnosed in the pre-transplant work-up and 210 underwent liver directed therapy prior to OLT. 45 (22.3%) of patients were outside of Milan before downstaging (ALTSG stage III – 27; stage IVA1 – 13; Stage IVA- 5). No patient beyond Milan who failed to downstage underwent OLT. One-, 3-, and 5-year patient survival in 45 down-staged cases was 91%, 82.4%, 78.9%, comparable to within-Milan TACE'd cases (92.9%, 80.8% and 69.3%). One-, 3-, 5-year recurrence-free survival in 45 down-staged cases was 86.5%, 80.4%, 72.6%, also comparable to within-Milan (88.4%, 77.7% and 64.2%). Recurrence rates were 19/249 (7.6%) for within Milan and 3/45 (6.7%) initially beyond Milan but downstaged.

Conclusion: Liver transplantation remains a highly effective therapy for patients with HCC, with excellent long-term survival and low recurrence risk. Patients beyond Milan should be required to undergo tumor downstaging with a period of observation prior to undergoing OLT.

LO-C.09 IS LIVER TRANSPLANTATION SAFE AND EFFECTIVE FOR GERIATRIC (>70 YEARS) RECIPIENTS? A CASE CONTROLLED ANALYSIS

G. C. Wilson, R. C. Quillin, K. Wima, J. M. Sutton, D. J. Hanseman, I. M. Paquette, F. Paterno, E. S. Woodle, D. E. Abbott and S. A. Shah
University Of Cincinnati Department Of Surgery, Cincinnati, OH

Introduction: As the US population continues to age, patients aged ≥70 years are being evaluated for liver transplantation (LT) with increasing frequency but their outcomes after LT are unknown.

Methods: Using a novel linkage of the University HealthSystem Consortium (UHC) and Scientific Registry of Transplant Recipients (SRTR) databases, we identified 13,819 patients who underwent LT from 2007–2012. Patients were sorted into two cohorts: recipient aged ≥70 years at LT (n = 318) vs. recipients <70 years (n = 12,073). A 2 : 1 case control analysis was performed with matched cohorts based on propensity scores.

Results: Older recipients had lower MELD scores at LT (median 15 vs. 19, $p < 0.0001$), were transplanted at high volume centers more (47.3% vs. 34.4%, $p < 0.0001$) and received more grafts from donors aged >60 years (24.2% vs. 15.5%, $p < 0.0001$), but had similar donor race, cause of donor death, DRI, and cold ischemia time ($p > 0.05$ for each). The two cohorts had similar hospital length of stay, in hospital mortality, hospital cost, and 30-day readmission rates. Graft survival was similar between the two cohorts ($p = 0.09$) but recipients ≥70 years had worse overall long-term survival ($p = 0.008$; Figure 1). A case controlled analysis confirmed that although hospital LOS was longer in the older cohort, short-term results were similar between the two groups.

Conclusions: Selected geriatric recipients have similar perioperative outcomes and graft survival compared to younger recipients; however, they have worse overall survival following LT suggesting that medical care and health maintenance may be important in long-term patient survival.

LO-C.10 RECIPIENT OBESITY ADVERSELY AFFECTS LONG-TERM GRAFT AND OVERALL SURVIVAL IN A SINGLE INSTITUTION ANALYSIS

K. D. Conzen[1], N. Vachharajani[1], K. M. Collins[1], C. D. Anderson[2], Y. Lin[1], J. R. Wellen[1], S. Shenoy[1], J. A. Lowell[1], M. Doyle[1] and W. Chapman[1]
[1]Washington University In St. Louis, Department Of Surgery, St. Louis, MO; [2]University Of Mississippi Medical Center, Department Of Surgery, Jackson, MS

Introduction: The effect of obesity in liver transplantation remains controversial. Earlier data from our institution demonstrated no significant difference in post-operative complications or one-year mortality. We hypothesized that obesity alone has minimal effect on long-term graft and overall survival.

Methods: A retrospective study of all primary orthotopic liver transplants (OLT) at our center (1/1/2002–12/31/2012) was conducted. OLT recipients were divided into six groups based on pre-transplant BMI: Group 1 (BMI < 18), Group 2 (18–24.9), Group 3 (25–29.9), Group 4 (30–35), Group 5 (35.1–40) and Group 6 (>40). Pre- and post-transplant parameters were compared between groups. Differences in outcomes were determined using the log-rank test, Chi-square test, and student's t-test; p-value < 0.05 was considered significant.

Results: Seven hundred eighty-five patients met inclusion criteria. Numbers of recipients in each group were: (group 1)9, (2)210, (3)294, (4)169, (5)77, (6)26. No differences were observed in race, age, massive ascites, or diabetes. Recipients with BMI >35 were more likely to have NASH cirrhosis ($p < 0.0001$) and wait longer for transplant ($p = 0.002$). There were no differences in operative time, ICU LOS, hospital LOS, vascular thrombosis, bleeding, biliary complications, or infection. Seven year graft survival (36.7% vs 62–79%) and overall survival (38% vs 62–81%) were significantly decreased for BMI >40 ($p < .02$).

Conclusion: Obesity increasingly impacts the field of liver transplantation. Although limited by a single institution, our data suggests that morbid obesity adversely affects long-term outcomes despite similar short-term results. Further analysis is indicated to identify risk factors for poor outcomes in morbidly obese patients.

FRIDAY, FEBRUARY 21, 2014, 5:00PM–6:30PM ORAL POSTER I (LIVER I, II; PANCREAS I, II; BILIARY I; TRANSPLANT I; OTHER)

OP-I.01 HIDA SCAN OF THE FLR IS SUPERIOR TO VOLUMETRY TO ASSESS LIVER FUNCTION IN ALPPS

E. Schadde[1], M. Lesurtel[1], N. Schäfer[2] and P. Clavien[1]
[1]Dept. Of Visceral And Transplant Surgery, University Of Zurich Hospital, Zurich, ZURICH; [2]Dept. Of Nuclear Medicine, University Of Zurich Hospital, Zurich, ZURICH

Introduction: ALPPS (Associating Liver Partition with Portal vein ligation for Staged hepatecomy) induces rapid hypertrophy, but the functionality of the tissue has been questioned even when volume cut-offs of the future liver remnants of 30% prior to resection are respected. ^{99m}-Technetium-mebrofenin clearance capacity of the future liver remnant (FLR) of less than 1.8 %/min/BSA using HIDA scintigraphy has been postulated to increase the risk of post-operative liver failure after resection. We assessed the value of HIDA in a pilot series of patients undergoing ALPPS and Portal Vein Embolization (PVE).

Methods: Four patients undergoing ALPPS were compared with 4 patients undergoing PVE before stage 1 and stage 2. Scintigraphy was performed by intraveneous injection 80 MBq^{99m} Technetium-mebrofenin. Dual head dynamic acquisitions were used to calculate FLR function. MRI volumetry was used to assess volume changes. Postoperative liver failure was assessed using 50/50 criteria.

Results: One patient in the ALPPS group and one patient in the PVE group developed fatal postoperative liver failure. These two patients had a FLR function after hypertrophy of only 2.14 (ALLPS) and 1.28 (PVE) %/min/BSA, despite having reached a FLR volume of greater than 30%. In contrast the FLR function of patients with an uncomplicated postoperative course was 3.6, 5.5 and 4.6 %/min/BSA in the ALPPS group and 2.3, 3.7 and 5.4 %/min/BSA in the PVE group.

Conclusion: In ALPPS and also PVE, assessment of FLR function using ^{99m} Technetium-mebrofenin clearance capacity of the future liver remnant is superior to volumetry to assess resectibility.

OP-I.02 MORBIDITY AND MORTALITY IN 1174 PATIENTS UNDERGOING HEPATIC PARENCHYMAL TRANSECTION USING A STAPLER DEVICE

M. Raoof[2], T. A. Aloia[1], J. Vauthey[1] and S. A. Curley[1]
[1]University Of Texas, MD Anderson Cancer Center, Houston, TX; [2]University Of Arizona, Tucson, AZ

Background: Transection of liver parenchyma using staplers is now commonly performed. Large studies are needed to assess the usefulness of the technique as well as perioperative outcomes.